Remarks

The Examiner is thanked for the Office Action dated 11/29/01 (request for 1-month extension of time enclosed). Claims 1 and 29 are canceled and new dependent claims 45-47 added. Only claims 2-11, 30-32 and 42-47 are presently under consideration (the remainder of the pending claims being withdrawn from consideration). Each of the Examiner's rejections are discussed in sequence below.

The Examiner objected to the Drawings. The first objection (Paragraph 2 of the Action) was that the they included reference numbers 16a-c in Figure 3 not mentioned in the description. Paragraph at page 7, lines 3-13 is being amended as indicated to specifically include this reference.

The next objection to the drawings (Paragraph 3 of the Action) is that they fail to show array 12 in Figure 5 as described in the specification, page 8, line 3. Array 12 is shown in Figure 4 and also described, for example, in the paragraph of page 7, lines 14-32. Thus, this structural detail (array 12) is in fact shown in Figure 4. First, page 8, line 3 to which the Examiner actually refers to the channels being just outside the "area covered by array 12", not the array 12 itself. In addition, as described on page 5, line 22, Figure 5 is a partially cut away top view of Figure 4. Since the array 12 is on the top of the package as shown in Figure 4 ("a top view of an array package...(including the substrate)" - per page 5, lines 20-21), the array 12 necessarily does not show in the partially cut away top view of Figure 5. To add array 12 to Figure 5 would be misleading.

The Examiner next objected to the drawings because reference character "38" was used to designate both "cavity" and "manifold". The paragraph bridging pages 9 and 10 is amended here to change "manifold 38" to "cavity 38".

In view of the above amendments and discussion, it is believed the drawing objections should now be withdrawn. Note that formal drawings were mailed to the Official Draftsperson on Feb. 28, 2002.

Turning now to the claims, claims 1, 29 have been canceled. All of the limitations of claim 1 are now recited in each of claims 5 and 6, with the exception that in each case the limitation of the "first set of multiple fluid distribution channels

each disposed between the first port and the multiple features" has been amended to "a first set of multiple fluid distribution channels each disposed between the first port and the chamber". Similarly, claims 31 and 32 have been rewritten to write out all of the limitations of claim 29 with the exception that the same foregoing change was made to the description of the first set of fluid distribution channels. Also, claim 5 has been amended to recite that "at least some of the fluid distribution channels are valved so as to be selectively closable or openable prevent or permit fluid flow out of the chamber to the first port".

Note that no substantive amendment has been made to these claims. This is so since incorporating the limitations of a base claim is not a substantive amendment. Furthermore, the change regarding the fluid distribution channels only further clarifies the claims. This is so since the claims recited that the multiple features face into "a chamber" (i.e. a single chamber). The previous language that the each of the channels was disposed between the first port and the multiple features necessarily means the channels are disposed between the first port and the chamber since the features are in the chamber. Similarly, with regard to the clarifying changes in the last paragraph of claim 5, these were made as follows: "wherein at least some of the fluid distribution channels are valved ~~such that they can~~ so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port". However, page 4, lines 29-32 already made it clear that by the fluid distribution channels being valved "they can be selectively activated (that is opened and closed) either continuously and/or in some sequence to control flow of fluid through them in a desired pattern (for example, to aid in washing of the array)".

New claims 45-47 are the same as claims 42-44 except they are dependent upon claim 32.

The Examiner rejected claims 5, 7-8 under 35 U.S.C. 112, second paragraph, as being indefinite due to the use of the word "can" in claim 5. Claim 5 has been amended to remove that word and more clearly recite that they are "valved so as to be selectively closable or openable".

The Examiner first rejected claims 1-4, 29-30, 42 as anticipated by Muller et al (USP 5,273,905). Claims 1 and 29 have now been canceled and the remainder of

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these claims are dependent upon claims 5, 6, or 31 (which are not rejected on this basis), and therefore this rejection should now be withdrawn.

Claims 1-5, 29-30, 42 were next rejected as being anticipated by Winkler et al. (USP 5,384,261). Claims 1 and 29 are canceled. Claims 2-4 are now directly or indirectly dependent on claim 6. Claims 30 and 42 are now dependent upon claim 31. Hence this rejection is now only relevant to claim 5. As pointed out above, claim 5 now recites that "a first set of multiple fluid distribution channels each disposed between the first port and the chamber" (i.e. the same chamber). As can be seen, for example, in FIGS. 5 and 7 of Winkler et al., and as the Examiner points out, Winkler et al's channels pass over multiple different respective regions of the substrate. At least one of the differences between claim 5 and Winkler et al. then, is that Winkler et al's channels are not disposed between the first port and a same chamber, as required by claim 5. Thus, this rejection in relation to claim 5 should now be withdrawn.

The Examiner next rejected claims 1-5, 9, 29-30, 42 as being anticipated by Freeman (WO 96/30124). Given the claim cancellations and dependency changes as discussed in the preceding paragraph, and given that claim 9 has now been made dependent upon claim 6, this rejection is now only relevant with regard to claim 5. As pointed out above, claim 5 now makes it clear that the channels "are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port". No such feature is disclosed in Freeman. Accordingly, this rejection of claim 5 should now be withdrawn.

The Examiner next rejected claims 1-6, 9, 29-31, 42 under 35 U.S.C. 102(e) as being anticipated by Juncosa et al. (USP 6,225,109). Claims 1 and 29 are canceled. The remainder of these claims are directly or indirectly dependent upon claims 5, 6, or 31. As pointed out above, one of the differences between Juncosa et al. and each of claims 5, 6, 31 is that each of those claims require "a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate". Each of Juncosa et al.'s channels are individual channels and are not each disposed between the first port and the chamber (i.e. the same chamber) into which the multiple features of the substrate face, as required by each of claims 5, 6, and 31. Accordingly, this rejection should now be withdrawn. In addition, claim 5 specifically recites that at least some of the fluid distribution channels are valved so as

to be selectively closable or openable. No such feature is disclosed in Juncosa et al. and this rejection should be withdrawn in relation to claim 5 for this additional reason.

The Examiner next rejected claims 10, 11 under 35 U.S.C. 103(a) over Muller et al., or Winkler et al, or Freeman, or Juncosa et al., in view of Besemer et al. (USP 6,287,850). These claims are directly or indirectly dependent upon claim 5, which is not rejected under this heading and accordingly should be allowed for the same reasons as claim 5.

The Examiner next rejected claims 7, 8 and 32 under 35 U.S.C. 103(a) as being unpatentable over Winkler et al., or Freeman, in view of Jun et al. Claims 7, 8 are directly or indirectly dependent upon claim 5 and should be allowed for the same reasons as claim 5. With regard to claim 32, this again requires a "first set of multiple fluid distribution channels each disposed between the first port and the chamber" (i.e. the same chamber). As discussed above, Winkler et al. does not disclose such a feature (nor does it suggest such a feature). While Freeman appears to show such an arrangement in Fig. 7b, there is no motivation to use the vapor bubble system of Jun et al. in Freeman's Fig. 7b device and, even if one did, the claimed invention would be not be obtained. On the first point, it is completely unclear how one could replace Freeman's three-way valve 90 with the bubble system of Jun et al. (which inherently cannot act as a three-way valve) so one is not motivated by the references to try the combination now suggested by the Examiner. On the second point, even if one did somehow make such a combination claim 32 requires that a bubble formation device be disposed in at least some of the fluid distribution channels (which are each disposed between the first port and the chamber). If one makes the combination suggested by the Examiner with Freeman's Fig. 7b device, then valve 90 is replaced in some manner with a bubble valve rather than channels 89 having a valve added thereto (which is not taught or suggested by Freeman). Thus, for either of the foregoing reasons (lack of suggestion from the references to make the combination; claimed device still not obtained even if the combination was made), the present rejection of claim 32 should be withdrawn. Note that claims 7, 8 contain a similar limitation as discussed in connection with claim 32 and should be allowed for this additional reason (i.e. in addition to their being dependent upon claim 5).

No Motivation To Combine

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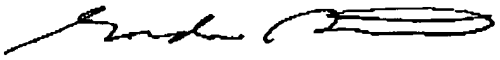
The Examiner next rejected claims 43 and 44 as being unpatentable over Muller et al., or Winkler et al., or Freeman, or Juncosa et al, in view of Katoot et al. (USP 6,184,030). Presumable this rejection would also apply to new claims 46, 47. These claims are directly or indirectly dependent upon claims 31 or 32 and should be allowed for the same reasons as those claims.

If the Examiner believes there are any outstanding issues which might be resolved by means of a telephone conference, she is invited to call Gordon Stewart at (650)485-2386.

Respectfully submitted,



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APPENDIX A

Showing All Non-Claim Amendments Presently Being Made

Paragraph at page 7, lines 3-13

Referring first to FIGS. 1 - 3, a contiguous planar transparent substrate 10 carries multiple features 16a, 16b, 16c (collectively referenced as features 16) disposed across a first surface 11a of substrate 10 and separated by areas 13. A second surface 11b of substrate 10 does not carry any features. Substrate 10 may be of any shape although the remainder of the package of the present invention may need to be adapted accordingly. A typical array may contain at least ten features 16, or at least 100 features, at least 10,000 features, or more. All of the features 16 may be different, or some or all could be the same. Each feature carries a predetermined moiety or mixture of moieties which in the case of FIGS. 1-3 is a polynucleotide having a particular sequence. This is illustrated schematically in FIG. 3 where regions 16 are shown as carrying different polynucleotide sequences. Arrays of FIGS. 1-3 can be manufactured by in situ or deposition methods as discussed above.

Paragraph at page 9, line 23 to page 10, line 6

After the reaction with array 12 is deemed to be sufficiently complete, a hollow needle in communication with a source of suitable wash fluid (such as an aqueous buffer solution) can be inserted through septa 43 of first port 42, while another hollow needle is inserted through septa 52 of second port 50 to allow for venting. The wash fluid is then forced from first port 42 through ~~manifold~~ cavity 38 under sufficient pressure that the previously established seals in channels 46 and 56 are broken (that is, the pressure is greater than the minimal pressure for all the channels). Thus, the wash fluid so added through first port 42 will be directed by the first set of channels 46 from first port 42 toward multiple different regions across first side 11a of substrate 10. Note that if positive valves such as provided by nucleating resistors 74 are present in first set of channels 46, they can be selectively activated

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(that is opened and closed) either continuously and/or in some sequence, to control the flow of wash fluid to different areas of array 12, so as to enhance coverage of the wash process. The first fluid (and, depending on how long it is desired to continue the operation, wash fluid also) will be vented from chamber 36 through the second set of channels 56 and out second port 50 (and the hollow needle inserted through septum 52). Optionally, septa 43, 52 can be removed at this point, to increase fluid flow.

APPENDIX B

Showing All Claim Amendments Presently Being Made

~~1. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port.~~

2. (AMENDED) A package according to claim ~~61~~, additionally comprising the received substrate.

3. A package according to claim 2 wherein the features comprise different biopolymer sequences.

4. A package according to claim 3 wherein the features comprise different DNA sequences.

5. (AMENDED) ~~A package according to claim 1,~~ A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;

_____wherein at least some of the fluid distribution channels are valved ~~such that they can~~ so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port.

6. (AMENDED) ~~A package according to claim 1~~ A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;

_____wherein at least some of the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

7. A package according to claim 5, additionally comprising a bubble formation device in at least some of the fluid distribution channels of the first set, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

8. A package according to claim 7 wherein the bubble formation device comprises a bubble nucleating resistor.

9. (AMENDED) A package according to claim ~~6~~ wherein fluid flow width increases between the first port to the first set of fluid distribution channels.

10. (AMENDED) A package according to claim ~~5~~ wherein the first port includes a closure member normally closing the first port.

11. A package according to claim 10 wherein the closure member comprises a resilient self-sealing member.

12. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, the housing including:

a first port through which the chamber is accessible;

a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port; and

a second port on a side of the multiple fluid distribution channels opposite that of the first port.

13. A package according to claim 12, additionally comprising the received substrate.

14. A package according to claim 13 wherein the features comprise different biopolymer sequences.

15. A package according to claim 14 wherein the features comprise different DNA sequences.

16. A package according to claim 12, wherein at least some of the fluid distribution channels are valved such that they can prevent or permit fluid flow out of the chamber to the first port.

17. A package according to claim 12 wherein the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

18. A package according to claim 12, additionally comprising a bubble formation device in at least some of the fluid distribution channels of the first set, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

19. A package according to claim 12 wherein fluid flow width increases between the first port to the first set of fluid distribution channels.

20. A package according to claim 12 wherein the first and second ports each includes a resilient self-sealing closure member normally closing the respective ports.

21. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, the housing including:

a first port through which the chamber is accessible,

a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;

a second port through which the chamber is accessible;

a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the second port; and

a third port which accesses the chamber at a position between the first and second sets of fluid distribution channels.

22. A package according to claim 21, additionally comprising the received substrate.

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23. A package according to claim 22 wherein the features comprise different biopolymer sequences.

24. A package according to claim 23 wherein the features comprise different DNA sequences.

25. A package according to claim 22 wherein the fluid distribution channels of the first and second sets are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

26. A package according to claim 22, additionally comprising a bubble formation device in at least some of the fluid distribution channels of at least one of the first and second sets, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

27. A package according to claim 22 wherein fluid flow width increases between the first port to the first set of fluid distribution channels and between the second port to the second set of fluid distribution channels.

28. A package according to claim 22 wherein the first port and second ports include respective resilient self-sealing members normally closing the respective ports.

~~29. A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate, the method comprising:~~

~~either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port.~~

30. (AMENDED) A method according to claim 31~~29~~ wherein the features comprise different biopolymer sequences.

31. (AMENDED) ~~A method according to claim 29~~ A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

wherein the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

32. (AMENDED) ~~A method according to claim 29~~ A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

_____wherein the package additionally has a bubble formation device in at least some of the fluid distribution channels of the first set, the method additionally comprising activating the bubble formation device in at least one of the fluid distribution channels so as to form a bubble is formed in the corresponding channel to retain fluid in the chamber.

33. A method of exposing an addressable array of multiple features carried on a first side of a substrate, using a housing and the substrate together to define a package which includes:

a chamber into which the multiple features face;

a first port through which the chamber is accessible,

a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate;

a second port through which the chamber is accessible; and

a third port which accesses the chamber at a position between the first set of fluid distribution channels and the second port;

the method comprising:

(a) adding a first fluid to be tested by the array to the chamber through the third port;

(b) adding a wash fluid through the first port such that the wash fluid is directed by the first set of fluid distribution channels from the first port toward multiple different regions across the first side of the substrate; and

(c) exhausting fluid through the second port.

34. A method according to claim 33 wherein:

the package includes a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the substrate, at least some of the fluid distribution channels of one of the sets being capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels;

the method additionally comprising:

following addition of the first fluid to the chamber, providing less than the minimal pressure differential across the capillary sized fluid distribution channels so as to retain the first fluid in the chamber; and

during addition of the wash fluid providing at least the minimal pressure differential across the capillary sized fluid distribution channels so as to exhaust fluid from the chamber through the capillary sized channels and the outlet port.

35. A method according to claim 33 wherein at least some of the first set of channels are valved, the method additionally comprising selectively activating the valves so as to control wash fluid entry through the first set of channels.

36. A method according to claim 35 wherein all of the fluid distribution channels of the first or second set are capillary sized.

37. A method according to claim 36 wherein all of the fluid distribution channels of the first and second sets are capillary sized.

38. A method according to claim 35 wherein the package includes a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the substrate, at least some of the fluid distribution channels of one of the sets including a bubble formation device so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber;

the method additionally comprising:

following addition of the first fluid to the chamber, activating the bubble formation devices so that the first fluid is retained in the chamber.

39. A method according to claim 38 wherein the bubble formation devices comprise bubble nucleating resistors.

40. A method according to claim 38 wherein all of the fluid distribution channels of one of the sets include the bubble formation device..

41. A method according to claim 38 wherein all of the fluid distribution channels of the first and second sets include the bubble formation device.

42. (AMENDED) A method according to claim 31~~29~~ wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.

43. (AMENDED) A method according to claim 31~~29~~ wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.

44. A method according to claim 43 wherein the sample was obtained from a location remote from the first location.

45. (NEW) A method according to claim 32 wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.

46. (NEW) A method according to claim 32 wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.

47. (NEW) A method according to claim 46 wherein the sample was obtained from a location remote from the first location.